California Environmental Protection Agency

Air Resources Board

Staff Report:
Proposed Adoption of Three California Climate Action Registry Greenhouse Gas Accounting Protocols for Voluntary Purposes

Planning and Technical Support Division
Emission Inventory Branch

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State of California
AIR RESOURCES BOARD

STAFF REPORT

PROPOSED ADOPTION OF THREE CALIFORNIA CLIMATE ACTION REGISTRY GREENHOUSE GAS ACCOUNTING PROTOCOLS FOR VOLUNTARY PURPOSES

To be considered by the Air Resources Board on September 25-26, 2008, at:

South Coast Air Quality Management District
Auditorium
21865 Copley Drive
Diamond Bar, California 91765

State of California
AIR RESOURCES BOARD

PROPOSED ADOPTION OF THREE CALIFORNIA CLIMATE ACTION REGISTRY GREENHOUSE GAS ACCOUNTING PROTOCOLS FOR VOLUNTARY PURPOSES

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The protocols can be found at http://www.arb.ca.gov/cc/protocols/protocols.htm

Executive Summary

The Air Resources Board (ARB or Board) staff proposes that the Board adopt three California Climate Action Registry (CCAR) protocols to provide tools for voluntary greenhouse gas (GHG) accounting. These protocols include one GHG emission inventory reporting protocol and two GHG project protocols for quantifying GHG emission reductions.

The Local Government Operations Protocol provides local governments with a technically sound and consistent quantification methodology for developing GHG emission inventories and tracking progress over time. This protocol includes calculation methodologies for sources under operational control of local governments, including buildings and other facilities, streetlights and traffic signals, water delivery facilities, port facilities, airport facilities, vehicle fleet, transit fleet, power generation facilities, solid waste facilities, wastewater facilities and other process and fugitive emissions. It is important to note that this protocol cannot be used to compare one local government to another. It is solely designed to create an emissions inventory for a local government, and track the emissions within that single jurisdiction's operations from one year to another.

The Urban Forest Project Reporting Protocol provides GHG calculation methodologies for urban forestry GHG emission reduction projects undertaken by local governments, agencies, utilities, and educational campuses. It includes calculation methodologies for carbon sequestration by urban tree growth, GHG emissions from tree losses, and GHG emissions from tree planting and maintenance activities.

The Livestock Project Reporting Protocol provides GHG emission calculation methodologies for capturing and destroying methane from manure digester GHG emission reduction projects. Calculation methodologies include emissions and emission reductions from manure production, treatment, storage and disposal, including transportation of waste.

These project protocols provide a sound basis for quality carbon accounting, and provide a methodology for complete, consistent, transparent, accurate, and conservative accounting of GHG emissions and reductions. This includes standardized eligibility rules, calculation methods, monitoring instructions, and procedures for reporting project information.

Each protocol presented in this staff report represents the results of public, multi-stakeholder processes. Each protocol was circulated for review by external experts, affected industries, government agencies, academia and interested stakeholders. The Local Government Operations Protocol and Urban Forest Project Reporting Protocol were adopted by the CCAR Board in August of 2008 along with an update to the Livestock Project Reporting Protocol, which was originally adopted in 2007.

Adoption of these protocols by the Air Resources Board would represent the Board's endorsement of quantification methodologies for carbon accounting in voluntary projects covered by the project protocols and for Local Government GHG inventory development. Board adoption of quantification methodologies, as set forth in the Global Warming Solutions Act of 2006, AB 32, (the Act) is a non-regulatory action.

Board consideration of the project protocols is consistent with the Policy Statement on Voluntary Early Actions to Reduce Greenhouse Gas Emissions, approved by the Board on February 28, 2008. The statement affirms Board commitment to encourage voluntary early actions to reduce GHGs and to work with CCAR and interested parties to adopt methodologies for quantification of voluntary GHG emission reductions. Board adoption of the quantification methodologies in these protocols would send a positive signal to entities considering voluntary projects using these protocols. While adoption by the Board may encourage early actions, it does not address the use of voluntary reductions to satisfy future AB 32 regulatory requirements. Before voluntary reductions can be used for AB 32 compliance, regulations to verify and enforce those reductions would need to be developed and adopted by the Board (Health and Safety Code (H&SC) section 38571).

The protocols can be found at: http://www.arb.ca.gov/cc/protocols/protocols.htm

I. Introduction

This report presents the ARB staff recommendation for Board adoption of three CCAR protocols to provide tools for voluntary carbon accounting. These protocols include one GHG inventory reporting protocol and two GHG project protocols for quantifying GHG reductions.

The Local Government Operations Protocol provides local governments with consistent methodology and quantification methods for developing their own GHG emission inventories and to track progress in reducing emissions over time.

The two project protocols, the Livestock Project Reporting Protocol and the Urban Forest Project Reporting Protocol, provide a solid basis for quality carbon accounting. They provide a methodology for complete, consistent, transparent, accurate, and conservative accounting of carbon emissions and reductions. This includes standardized eligibility rules, calculation methods, monitoring instructions, and procedures for reporting and verifying project information.

The CCAR protocols provide rigorous methodologies that were developed over an extended, broad-based, public process and have undergone extensive review.

This report discusses how voluntary GHG reductions are addressed in the Act, how the protocols were developed, and a brief description of each protocol.

II. Voluntary Actions and Implementation of AB 32

ARB encourages voluntary actions to reduce GHG emissions as part of California's effort to meet the 2020 emission target established by the Act. There is substantial stakeholder interest, and voluntary actions can be a significant source of emission reductions.

The Act gives a high priority to voluntary reductions, and sets forth a number of specific directives to ARB related to voluntary reductions:

- Adopt methodologies for the quantification of voluntary GHG emission reductions (a non-regulatory Board action)
- In the Scoping Plan, identify opportunities for verifiable and enforceable voluntary emission reduction actions
- For purposes of compliance with AB 32 reductions, ensure that entities that have previously made voluntary emission reductions receive appropriate credit
- Adopt regulations to verify and enforce any voluntary GHG reductions that would be used to comply with AB 32 GHG emission limits

The Act also required ARB to identify a list of "discrete early action" GHG emission reduction measures by June 30, 2007. Discrete early actions are measures to be

developed into regulatory proposals adopted by the Board and made enforceable by January 1, 2010. In addition to the discrete early actions, ARB staff has developed a broader list of "early actions" which includes actions to promote voluntary reductions. This broad list includes a mix of regulatory and non-regulatory GHG reduction strategies which could be implemented during the 2007-2012 timeframe. The Forest Greenhouse Gas Accounting Protocols, adopted by the Board in October 2007, and the Livestock Project Reporting Protocol, proposed for Board adoption in September 2008, are listed as early actions measures.

Adoption of the protocols is a non-regulatory action as set forth in AB 32. Board adoption of the quantification methodologies in these protocols represents the Board's endorsement of technically sound approaches for carbon and GHG accounting in voluntary projects and inventory development. GHG reductions resulting from implementation of the project protocols can be registered and used in the voluntary market. However, before these voluntary GHG reductions can be used for AB 32 compliance, regulations to verify and enforce those reductions would need to be developed and adopted by the Board. Therefore, Board adoption of voluntary protocol quantification methodologies, is only a first step in the process of addressing the role of voluntary reductions in ARB's climate change program.

III. Context and Process for CCAR Protocol Development

The California Climate Action Registry is a private non-profit organization originally formed by the State of California. CCAR serves as a voluntary GHG registry and develops and promotes credible, accurate, and consistent GHG reporting standards and tools for organizations to measure, monitor, third-party verify, and reduce their GHG emissions consistently across industry sectors and geographical borders.

ARB staff has worked in conjunction with CCAR staff and stakeholders in the development of the three protocols proposed for Board adoption and presented in this staff report. Each protocol was developed in an open multi-stakeholder public process which included numerous workgroup meetings, stakeholder meetings and public workshops. ARB staff has reached out to stakeholders to explain the proposed action and gain an understanding of the views the affected sectors on the protocols.

IV. Local Government Operations Protocol

The Local Government Operations Protocol provides local governments with a technically sound, consistent methodology and quantification methods for developing their own GHG emission inventories. Calculation methodologies include sources such as buildings and other facilities, streetlights and traffic signals, water delivery facilities, port facilities, airport facilities, vehicle fleet, transit fleet, power generation facilities, solid waste facilities, wastewater facilities and other process and fugitive emissions.

A. Role of Local Government Operations in Climate Change Mitigation

There 479 cities, 58 counties and over 2000 special districts in California, all of which can contribute significantly to California's efforts to reduce GHG emissions. GHG emission reductions are already being achieved through a variety of local actions. CCAR's membership includes 18 California cities, five counties, and dozens of special service districts, including municipal utility districts, water and wastewater districts, transit districts, and air pollution control districts. ICLEI - Local Governments for Sustainability (ICLEI) has 26 California members participating in their Cities for Climate Protection (CCP) Campaign.

Local governments can lead community scale efforts by example as they reduce GHG emissions from municipal operations. In order to reduce GHG emissions, local governments must first measure their carbon footprint. The Local Government Operations Protocol offers a standardized tool for local governments to determine and track their own carbon footprint through the development of a GHG emission inventory, though this cannot be used as a point of comparison from one government to another.

B. CCAR Local Government Operations Reporting Protocol Description

To fit into a statewide, national, and international GHG accounting framework, local government GHG accounting and inventory development must meet recognized and robust standards. It is important that the principles, approach, methodology and procedures used to develop local government operations GHG emissions inventories be complete, transparent, and accurate. The Local Government Operations Protocol is designed to provide a standardized set of guidelines to assist local government in quantifying and reporting GHG emissions associated with operations that a local government owns and/or operates. By providing a standardized format, this Protocol will enable local governments in California to develop and report consistent and accurate GHG inventories that can track reductions in overall GHG emission to support the State's AB 32 program and goals.

The Protocol provides local governments with the quantification methods for developing their own GHG emission inventories for six internationally-recognized GHGs which include carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons and perfluorocarbons. While it contains many elements of existing ICLEI and CCAR protocols, it contains more detail with respect to local government operations and contains portions which can be used by specific types of local governments, such as special districts, to calculate GHG emissions. The Local Government Operations Protocol follows the calculation and accounting approaches developed by World Resources Institute and Western Business Council for Sustainable Development and covers the following:

- Scope 1 emissions: All direct GHG emissions (except biogenic CO2)
- Scope 2 emissions: Indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating or cooling
- Scope 3 emissions: All other indirect emissions not covered in Scope 2

In addition to the scope types, the Protocol also categorizes emissions into local government sectors which include buildings and other facilities, streetlights and traffic signals, water delivery facilities, port facilities, airport facilities, vehicle fleet, transit fleet, power generation facilities, solid waste facilities, wastewater facilities and other process and fugitive emissions. Categorizing the GHG inventory according to these sectors can aid in the identification of reduction opportunities.

The Protocol is meant to be a "program neutral" guidance document, meaning that it is not tied to CCAR, ICLEI, The Climate Registry (TCR) or ARB GHG programs. It brings together technical GHG inventory guidance from a number of existing programs, namely the guidance provided by ICLEI to its Cities for Climate Protection Campaign and the guidance provided by CCAR through its General Reporting Protocol. Program specific requirements for each of the partner organizations are described in chapters at the end of the Protocol. If a local government is a member of either ICLEI or CCAR, they are subject to program-specific requirements in addition to the general guidance embodied in the Protocol.

It is important to note that the purpose of this Protocol is to assist local governments in developing a GHG emissions inventory; it does not apply to GHG emission reduction projects that are to be used as offsets. GHG emission reduction projects should be quantified using a project quantification method that addresses issues such as baseline, additionality, permanence and ownership. In addition, the Protocol was not intended to provide a means to compare one local government's GHG emissions to another's. Local governments vary widely as do their emissions. The primary intent is for a local government to compare improvements of its own operations over time.

C. Process for CCAR Local Government Operations Protocol Development

The Local Government Operations Protocol was developed in partnership by CCAR, ARB, and ICLEI, in collaboration with TCR and dozens of stakeholders. A kick-off public workshop was held on March 11, 2008. The partners formed a multi-stakeholder Technical Workgroup which met weekly and strived for consensus-based decision making to promote broad participation and adoption.

Subgroups were formed to provide the Technical Workgroup with key technical expertise to the areas of solid waste and wastewater. In addition to the Technical Workgroup and subgroups, a Local Government Advisory Stakeholders Group was formed to provide further technical assistance, review and comment. Each of these groups focused on obtaining input from stakeholders representative of California's rural, suburban, and urban cities and counties. ARB staff held a meeting to discuss the protocol with the Advisory Group April 22, 2008 and May 27, 2008. ARB and CCAR hosted a public workshop and webcast on July 10, 2008 to solicit further public comment prior to completing the draft protocol. All interested parties were invited to participate in the process. After a period of public review and comment, the Protocol was adopted by the CCAR Board in August 2008.

The Local Government Operations Protocol is available in its entirety under separate cover and can be located at http://www.arb.ca.gov/cc/protocols/protocols.htm

V. Urban Forest Project Reporting Protocol

The Urban Forest Project Reporting Protocol provides GHG calculation methodologies for urban forestry GHG emission reduction projects undertaken by local governments, agencies, utilities, and educational campuses. It includes calculation methodologies for carbon sequestration by urban tree growth, GHG emissions from tree losses, and GHG emissions from tree planting and maintenance activities.

A. Role of Urban Forests in Climate Change Mitigation

Urban land use in California comprises approximately 5 million acres, equivalent to the land area represented by hardwood woodlands in the State (FRAP 2003). California's urban areas in 1990 contained 177.3 million trees and exhibited tree canopy cover on the order of 10 percent (McPherson and Simpson 2003), constituting a growing portion of "forest" cover in the state. A climate protection role for urban forests has been recognized by the Climate Action Team (CAT 2007) and by ARB's draft Scoping Plan, where Urban Forestry is one of five non-regulatory opportunities (reforestation, conservation forest management, avoided development, fuels management & biomass, urban forestry) to enhance the capacity to remove atmospheric CO2.

Urban forests are comprised of tree populations planted and managed in public and private space. Municipal urban forestry programs manage street and park land trees. The terms "urban (or community) forestry programs" and "shade tree programs" are often used interchangeably to refer to tree planting and stewardship aimed at achieving CO2 reductions or other benefits. Such programs are often partnerships between governments, utilities, and non-profit organizations. Urban forestry is supported at the national and state levels by the Urban and Community Forestry programs of the USDA Forest Service and the California Department of Forestry and Fire Protection (CAL FIRE). CAL FIRE expends approximately $3.5 million dollars annually in grants and other support to urban forestry activities throughout the state (CAL FIRE 2008).

Urban forests reduce atmospheric CO2 directly and indirectly. Growing trees directly absorb atmospheric CO2 via photosynthesis, storing carbon in tissues (leaves, stems, trunks, roots) in a process called sequestration. Trees around buildings can reduce the demand for heating and air conditioning, indirectly reducing GHG emissions associated with utility generation (Abdollahi et al. 2000). Through shade and evaporative cooling, urban forests also reduce the "urban heat island effect" (US EPA 2008).

There are opportunities for California's urban forests to achieve additional GHG reductions. CAL FIRE estimates that at current planting rates, urban trees can yield approximately 1 million metric tons (MMT) CO2 reduction annually (CAT 2007). USDA Forest Service researchers identified approximately 241 million potential urban tree

planting sites in the state, and estimated that 50 million trees planted near buildings in California's urban areas would annually remove 4.5 million metric tons (MMT) of atmospheric CO2 (68 MMT over 15 years), and avoid 1.8 MMT annual GHG emissions from utility power generation (McPherson and Simpson 2003 and CCAR Urban Forest Project Reporting Protocol).

B. CCAR Urban Forest Project Reporting Protocol Description

To fit into a statewide, national, and international GHG accounting framework, urban forest project accounting must meet recognized and robust standards. This requires that GHG reductions be real, additional, independently verified, not double-counted, and permanent. To ensure a standard currency across climate change programs, quantification uncertainty in the urban forest sector should not exceed that of other sectors. Accurate urban forest carbon stock accounting is a critical component for measuring atmospheric CO2 removals and emissions. The CCAR Urban Forest Project Reporting Protocol is designed to provide accurate and standardized GHG accounting methods to measure atmospheric CO2 removal by urban trees and GHG emissions associated with their management.

The Protocol provides a standardized accounting methodology for complete, consistent, transparent, accurate, and conservative accounting of CO2 reductions and GHG emissions associated with urban forest projects undertaken by local governments, agencies, utilities, and educational campuses. The Protocol defines urban forest GHG reduction projects, eligibility rules, project boundaries, provides GHG reduction (and emission) calculation methods, and identifies procedures for project monitoring, reporting parameters, and verification.

Urban forest projects entail a 100 year reporting time frame and a minimum of 1,000 planting sites. Planting sites must have an average spacing of no less than 5 meters to satisfy assumptions of open-grown urban tree growth equations. Protocol guidance states that for large forested tracts (≥ 100 contiguous acres) within urban areas, the CCAR Forest GHG protocols should be used.

Reporting atmospheric CO2 reductions as measured by urban tree growth and GHG emissions associated with project tree management are mandatory reporting obligations within this voluntary protocol. Removal of atmospheric CO2 is measured as carbon stock increase (tree growth), while atmospheric releases are measured as carbon stock losses. GHG emissions from vehicles and equipment (chainsaws, chippers, etc.) are estimated using standard calculations. Project proponents must monitor and report expenditures and levels of service for both project and non-project trees, to prevent resource shifts and potential losses resulting from degraded non-project trees. Stock declines from project trees lost to disturbance or disease must be reported, and lost planting sites must be replaced. The project protocol also requires that potential negative impacts (inappropriate tree species selection, conflicts with utility service, hardscape, solar access, other land use etc.) be mitigated.

The Protocol provides an option to report, but not register, indirect benefits from building energy use reduction and fossil fuel substitution. A calculation tool is provided to estimate those specific, indirect benefits.

C. Process for CCAR Urban Forest Project Reporting Protocol Development

The CCAR Urban Forest Project Reporting Protocol was developed over a two year multi-stakeholder process which began in September 2006. CCAR assembled a 19 member Steering Committee comprised of representatives from CCAR, CAL FIRE, the USDA Forest Service, the California Energy Commission (CEC), the Sacramento Municipal Utility District (SMUD), three non-governmental organizations (Tree People, Pacific Forest Trust, Ecosecurities), ARB, and a professional arborist. An eleven member Drafting Committee developed an outline and draft of the Protocol. A twenty-five member Technical Committee comprised of subject-matter experts in urban forestry, building energy use, forest biometrics, carbon sequestration, and biomass utilization provided peer review of methods and the final documents. An eighty-four member Stakeholder Committee provided comment on the outlines and draft protocols.

Prior to the proposed Board adoption of the Urban Forest Project Reporting Protocol, ARB and CCAR hosted a public workshop and webcast on July 29, 2008 to solicit further public comment. Since early July 2008, CCAR and ARB web pages have also solicited protocol review comments via email, post, and telephone. The Protocol was adopted by the CCAR Board in August 2008.

The Urban Forest Project Reporting Protocol is available in its entirety under separate cover and can be located at http://www.arb.ca.gov/cc/protocols/protocols.htm

VI. Livestock Project Reporting Protocol

The Livestock Project Reporting Protocol provides GHG calculation methodologies for manure digester GHG emission reduction projects. Calculation methodologies include emissions and emission reductions from manure production, treatment, storage and disposal.

A. Role of Livestock and Manure Digesters in Climate Change Mitigation

California is home to about 1,800 dairies with over 1.7 million dairy cows. The resulting manure is a significant source of methane that can be emitted to the atmosphere or captured and used for heat and/or energy. Manure digesters (digesters; also called biogas control systems) are systems which trap gaseous emissions from manure (primarily methane) and combust the gas. The trapping process is achieved by enclosing the manure, which often involves covering a manure lagoon with plastic or otherwise isolating the manure from the ambient environment. Methane captured through the installation and use of an anaerobic digester can be used for electric power

production, for heat, as an alternative to natural gas (whether for pipeline injection or on-farm use), or as a transportation fuel, among others.

B. CCAR Livestock Project Reporting Protocol Description

To fit into a statewide, national, and international GHG accounting framework, livestock manure digester project accounting must meet recognized and robust standards. This requires that GHG reductions be real, additional, independently verified, not double-counted, and permanent. The CCAR Livestock Project Reporting Protocol is designed to provide accurate and standardized GHG accounting methods to calculate the annual greenhouse gas benefits from capturing and destroying methane (e.g., utilization for heat, pipeline injection, electricity generation, etc.) that ordinarily would have been emitted into the atmosphere.

The Protocol provides a standardized accounting methodology for complete, consistent, transparent, accurate, and conservative accounting GHG emissions and emission reductions associated with manure digester projects. The Protocol defines eligibility rules, project boundaries, provides GHG reduction (and emission) calculation methods, and identifies procedures for project monitoring, reporting parameters, and verification.

The Protocol covers direct emissions of methane (CH4) and carbon dioxide (CO2) associated with waste production, treatment and storage, and waste disposal including emissions associated with transporting manure. Emission calculations for direct CH4 and CO2 emissions associated with the project include variables such as animal mass, population, and ambient average temperature as well as variables related to the resulting biogas such as collection and destruction efficiencies.

Because of the uncertainty in calculation methods for determining nitrous oxide (N2O) emissions associated with projects, these emissions or emission reductions are not included in the current protocol. In addition, the use of biogas for producing power for the electricity grid or electricity for on-site use, thereby displacing fossil-fueled power plant GHG emissions, is considered a complementary and separate GHG project activity and is not included within the protocol accounting framework.

To be eligible to use the protocol, project developers must show that there are no state or federal regulations or local agency ordinances/rulings requiring the installation of a biogas control system. In addition, projects must comply with all applicable local, state, and national regulations, whether for air and water quality, energy regulations, or others.

While there has been significant stakeholder interest in co-digestion, processing food waste or other organics with manure, the current protocol covers manure digestion only.

C. Process for CCAR Livestock Project Reporting Protocol Development

In April of 2006, CCAR began developing a protocol for calculating GHG emissions and emission reductions resulting from the instillation and operation of a manure digester (biogas control system). The protocol development process included scoping meetings,

multiple working group meetings and numerous document reviews by various stakeholders including industry, government, academia, and the general public.

International and national best practices for agricultural calculation were used in developing the protocol's methodologies. After more than a year of stakeholder involvement followed by a period of public review, the Protocol was presented to CCAR's board for adoption, and was approved in June 2007. The result is a protocol that provides the methodologies for quantifying baseline manure emissions as well as the emission reductions resulting from the installation and operation of a manure digester.

Following the adoption of the first version of the Livestock Project Reporting Protocol by the CCAR Board, stakeholders submitted numerous constructive comments as to how the protocols functioned in real-world projects and options for making them "user-friendly". Utilizing this feedback, as well as additional interaction with stakeholders, an updated version (Version 2.0) of the Livestock Project Reporting Protocol was drafted in June 2008. Following a public comment period highlighted by a joint public workshop with ARB on July 11, 2008, public comments were incorporated into the updated Protocol which was adopted by the CCAR Board in August 2008. The Protocol was updated again shortly thereafter with a single technical change (Version 2.1).

The Livestock Project Reporting Protocol (Version 2.1) is available in its entirety under separate cover and can be located at http://www.arb.ca.gov/cc/protocols/protocols.htm

VII. Recommendations

The Local Government Operations Protocol, Urban Forest Project Reporting Protocol, and Livestock Project Reporting Protocol, represent the results of public, multi-stakeholder processes that included the work of leading experts in protocol development and industry guidance. They provide rigorous, standardized tools for voluntary carbon accounting.

Staff recommends the non-regulatory adoption of these protocols by the Board. By adopting these protocols, ARB sends a signal about its recognition of the importance of early reductions that can be achieved through implementation of voluntary projects covered by the project protocols, and the significant contributions local governments can make to meeting the State's GHG goals.

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